

Prevalence of Daily Physical Activity and Obesity Among Students Grade 5th and 6th

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Background: One of the most pressing threats for children's health status is overweight and obesity. Previous literature indicates that increasing relative body mass index (RBMI) is accompanied by physical inactivity.

Objectives: The aim of this study was to determine the prevalence of daily physical activity and obesity among students grade 5th and 6th.

Patients and Methods: This was a cross-sectional descriptive study carried out to determine the distribution of daily physical activity according to gender and relative body mass index in overweight and obese children. We randomly selected 12 primary schools and studied their health profiles, including body mass index (BMI) and RBMI. We then selected those who were in the range of overweight and obesity based on the National Centre for Health Statistics (NCHS). Daily physical activities of the subjects were assessed by a self-administered recall tool and concurrently via interviewing the subjects' mothers.

Results: There was a significant difference between the prevalence of obesity and being overweight between genders ($P = 0.000$). Overweight children, regardless of their gender, had higher daily physical activity than obese individuals and the ANOVA test showed a significant difference between means of daily metabolic equivalent of task (MET) for different genders and relative body mass index ($P = 0.000$).

Conclusions: As increasing RBMI is concomitant with decreased daily physical activities in both genders, it is important to set plans to increase physical activities of obese children rather than overweight ones.

Keywords: Physical activity; Overweight; Obesity; Students

1. Background

The greatest prevalence of childhood obesity has been observed in developed countries however this prevalence is increasing in developing countries as well (1). Obesity is becoming a leading threat to the health of children and adolescents. Many causes, modifiable and non-modifiable, have been determined and include, but are not limited to, genetic factors, medical conditions, medications and environmental factors (2-7). Thus far, investigations show that continuous worldwide increase of being overweight and obesity is a big threat for public health. Meanwhile physical activity promotion has been spotted as a powerful strategy for reducing this tragedy (8-11). Physical activity is defined as any movement of muscles with energy consumption, with or without transposition (12-14). Many benefits emerge from regular physical activities including, enhanced physical fitness, weight loss, mental and physical health promotion (15-18).

Definitions of overweight and obesity in children have been debated upon over the years. In children, overweight is defined as a body mass index (BMI) between the 85-95 percentile according to age and gender specific growth charts, while a BMI greater than the 95 percentile

on growth charts indicates obesity (3, 19, 20). Since there are BMI changes during childhood, RBMI is used as an estimate of overweight percentage [$\text{BMI}/50\text{th percentile BMI on age-gender specific growth chart} \times 100$] (2, 19, 21, 22).

In the United States the prevalence of obesity in children aged 6-11 years has doubled in the last thirty years of the 20th century and yet some studies report greater prevalence of overweight and obesity in rural areas of USA. Research has revealed that the majority of children obesity trends continue into adulthood (23). In children six years and older, the probability of obesity in adulthood exceeded 50% if the child was obese as compared to 10% for non-obese children. Multiple studies link child obesity to subsequent mortality and morbidity in adulthood (23, 24). A cross-sectional study on Iranian 6-11 year-old students demonstrated that obesity is not correlated with gender difference. In line with this investigation, the center for disease control (CDC) has reported that the overall prevalence of being overweight is 8.1% and 5.7% in male and female students, respectively (25, 26). Studying the prevalence of daily physical activity in children, especially in overweight and obese individuals, is attractive

for researchers as such information with help enhance children's physical activities and result healthy consequences.

2. Objectives

The aim of this study was to determine the prevalence of daily physical activity and obesity among students grade 5th and 6th.

3. Patients and Methods

This cross-sectional descriptive study was part of a PhD research proposal carried out to determine the distribution of daily physical activity according to gender in obese and overweight students. Approval for the study was obtained from the Tarbiat Modares University (TMU) and Qazvin's Education and Training Organization (QETO). Written informed consent was obtained from all subjects and their parent/guardian prior to their participation in the study. We randomly selected 12 primary schools, six girls and six boys' schools, from two zones of QETO and studied their health profiles, which were previously documented by school health instructors. We then selected those who were in the range of being overweight and obesity based on the National Centre for Health Statistics (NCHS). Sampling inclusion criteria consisted of, lack of medical or non-medical limitation for physical activity and $\text{RBMI} \geq 85^{\text{th}}$ percentile. Then, the subjects height and weight were measured by well-trained data collectors and with standard procedures and equipment based on John Himes method (27). The number of subjects who had a RBMI over the 85^{th} percentile was 302 (based on the six constructs evaluated in the main project). The following characteristics were recorded for these subjects, gender, weight, height, BMI and RBMI. Assessing the subjects' daily physical activities were done with a self-administered recall tool and concurrently via interviewing the subjects' mothers. Then daily energy consumption measured as the metabolic equivalent of task (MET) was calculated based on previous day physical activity recall (PDPAR) scoring (28-30) as part of the tool. As part of the interview, we asked mothers to estimate the students' weekly moderate (MPA) and vigorous (VPA) physical activities and walking time in hours and minutes. Based on the international physical activity questionnaire (IPAQ) (31, 32) we calculated weekly MET as $[(\text{Walking time} \times 3.3) + (\text{MPA} \times 4) + (\text{VPA} \times 8)]$ and by dividing the sum by seven, daily MET was calculated. For analyzing the data, we calculated statistical indexes and analytical parameters such as mean, standard deviation and mean differences, using the SPSS software version 17.

4. Results

The aim of this study was to determine the distribution of daily physical activity measured as metabolic equivalent of task (MET) according to gender and RBMI in

overweight and obese students. Distributions of RBMI in Table 1 show that 62.3% of samples are in the range of the 85^{th} - 95^{th} percentile, meaning that they are overweight and 37.7% are above the 95^{th} percentile indicating that they are obese. The chi-square test revealed a significant difference in RBMI distribution for different genders ($P = 0.000$). This means that being overweight in girls is higher than boys while obesity has an inverse distribution. Table 2 shows the results of interviews with subjects' mothers, regarding their child's physical activity and Table 3 shows the distribution of the samples' daily MET by gender and RBMI. As shown in this table, the ANOVA test revealed a significant difference between daily MET based on gender and RBMI distributions ($P = 0.000$). Overweight children, regardless of their gender, had a higher daily physical activity than obese individuals.

Table 1. Distribution of RBMI by Gender in Obese and Overweight Students ^{a,b}

BMI Percentile	Female	Male	Total	Chi-Squire
85-95	112 (33)	76 (25)	188 (62.3)	0.000
≥ 95	48 (15)	66 (21)	144 (37.7)	0.000
Total	160 (52)	142 (47)	302 (100)	0.000

^a Data are presented as No. (%).

^b Chi-square test shows a significant difference between the frequency of being overweight and obesity between genders.

Table 2. Subjects' Daily Physical Activity Based on Interviews With Their Mothers ^a

Questions	Results
How many days a week, your child does vigorous physical activity?	2.13 ± 0.91
How many hours a day, your child does vigorous physical activity?	1.11 ± 0.62
How many days a week your child does moderate physical activity?	2.28 ± 0.87
How many hours a day, your child does moderate physical activity?	0.96 ± 0.12
How many days a week, your child does walking?	1.95 ± 0.54
How many hours a day, your child does walking?	0.9 ± 0.10

^a Data are presented as Mean \pm SD.

Table 3. Mean and Standard Deviation of Distributions of Daily Metabolic Equivalent of Task by Gender and RBMI ^{a,b}

Male		Female	
Overweight	Obese	Overweight	Obese
5.62 ± 0.69	5.50 ± 0.63	4.32 ± 1.07	4.12 ± 0.91

^a Data are presented as Mean \pm SD.

^b ANOVA shows significant a difference between mean of being overweight and obesity between and within genders (ANOVA is 0.000).

5. Discussion

The chi-square test showed an obvious difference between RBMI distributions for different genders. As shown in Table 1, females had a higher rate (33%) of being overweight (RBMI between 85-95) and lower rate (15%) of obesity (RBMI ≥ 95) in comparison with the male gender. Prevalence of obesity and being overweight in the whole population and its differences for different genders has been a concern for health researchers. In spite of the existence of variation in prevalence reports of obesity and being overweight in children, all studies have indicated a significant relationship between gender and RBMI. In line with this finding, Kelishadi and colleagues in their study, reported similar findings. They found that the prevalence of obesity in boys is higher than girls but overweight prevalence has the reverse distribution (33, 34). Nabavi and colleagues, in their study related to prevalence of obesity in 7-12 year-old students, reached the same results (35). Meanwhile some studies have mentioned that the prevalence of both obesity and being overweight in boys is higher than girls (35). Nonetheless, obesity prevalence in boys is higher than girls, and this suggests that priority should be given to weight control programs for males.

Furthermore, this study revealed a significant difference between daily physical activities in both genders for different RBMI ranges. Based on this finding, in both genders overweight subjects do more daily physical activities and thereupon have more energy expenditure (MET) than obese individuals and the ANOVA test showed significant differences for daily MET consumption between and within genders. The presence of an inverse relationship between daily physical activities and weight gain was obvious; change in body compositions was accompanied by physical inactivity (36). Many physicians and health workers recommend that obese and overweight clients should do more physical activities, regardless of their age or gender (37-39). In spite of these benefits, both physical activity and weight gain have inverse effects on each other. It is not obvious which one can predict the other. There are some guidelines for daily physical activity suitable for various age groups and although there are differences in these guidelines, they are unimportant (31, 40, 41).

In summary, based on the findings of this study and considering the high prevalence of overweight and obesity in children and contemporary decline of daily physical activity with increasing weight, it is necessary to plan a proper intervention to promote physical activities in overweight and obese children.

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Authors' Contributions

Study concept, design and analysis of data: Hosseinzadeh; data interpretation and drafting of the manuscript: Niknami; critical revision of the manuscript and statistical analysis: Hidarnia.

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